The effect of a buoyancy jacket on the heart rate of dogs during swimming

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Introduction

Canine hydrotherapy is becoming increasingly popular for rehabilitation, management of degenerative conditions and as a fitness training aid. During swimming, the use of buoyancy jackets is recommended to provide support and ensure a neutral spinal position, with these aids being particularly utilised for weak and vulnerable patients [1, 2]. The National Association of Registered Canine Hydrotherapists (NARCH) recommend the use of buoyancy jackets to provide support and ensure a neutral spinal position is maintained. One study found a reduced range of motion in dogs swimming wearing flotation devices due to downward pitching and consequently dogs having to compensate to keep their heads above the water [3]. Despite being commonly used and recommended, there is minimal research investigating the effect of buoyancy aids on physiological parameters in swimming dogs. The aim of this study was to assess the effect of a buoyancy aid on the heart rate of swimming dogs and to quantify the effect of a buoyancy jacket on displacement above the water surface.

Methods

Seven healthy dogs (mean age of 2.56 ± 2 years) of various breeds were recruited for use in this study. All dogs were approved for participation by a veterinarian and all hydrotherapy sessions were performed by a qualified canine hydrotherapist. All dogs had previously been acclimatised to the pool prior to the commencement of data collection. All dogs completed six laps of a hydrotherapy pool with and without a buoyancy jacket. When not wearing a buoyancy aid, all dogs were fitted with a standard safety harness (Figure 1). Dogs were fitted with a Polar heart rate monitor (sampling once every five seconds) which was worn under the buoyancy jacket or harness and kinematic markers were placed on both the dorsal and medial aspect of the jacket or harness. Vertical displacement of the dogs was calculated in motion analysis software and corrected for the thickness of the buoyancy jacket. Data were analysed via a paired t-test to test for differences in displacement and heart rate between the two conditions.

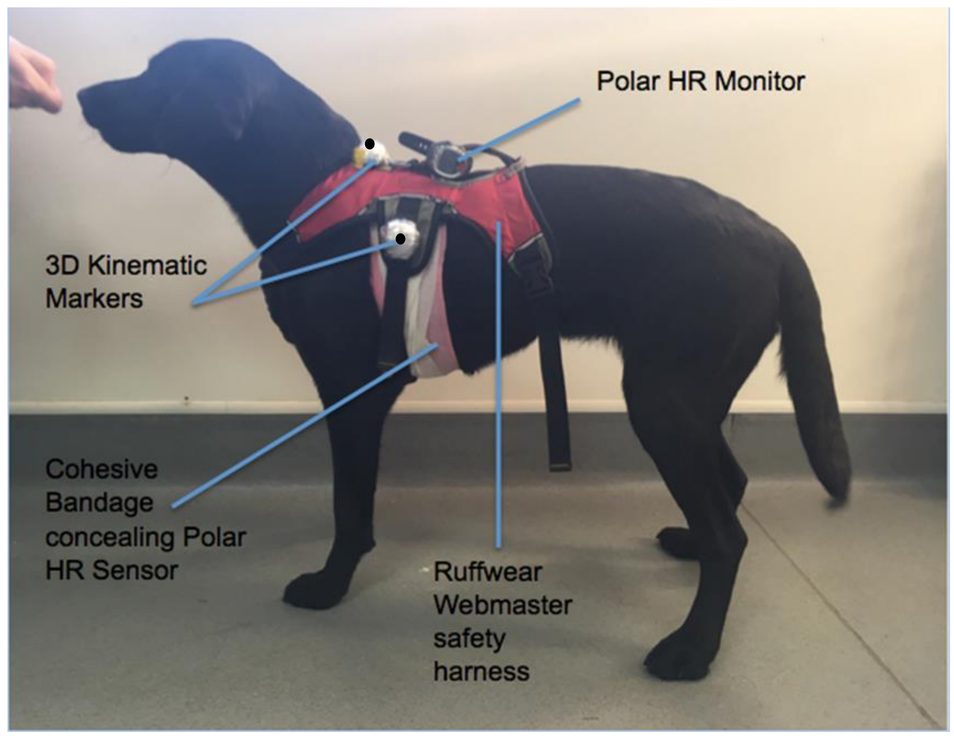


Figure 1. Dog wearing a safety harness (top) and a buoyancy aid (bottom).

Results

Minimum heart rate was significantly lower (p<0.05) in the buoyancy jacket compared to the harness. However, there was no significant difference in maximum (p = 0.864) or mean (p = 0.089) heart rate between the jacket and harness. Minimum and maximum displacement (p< 0.001) were significantly higher for dogs swimming in the buoyancy jacket compared to the harness (Figure 2).

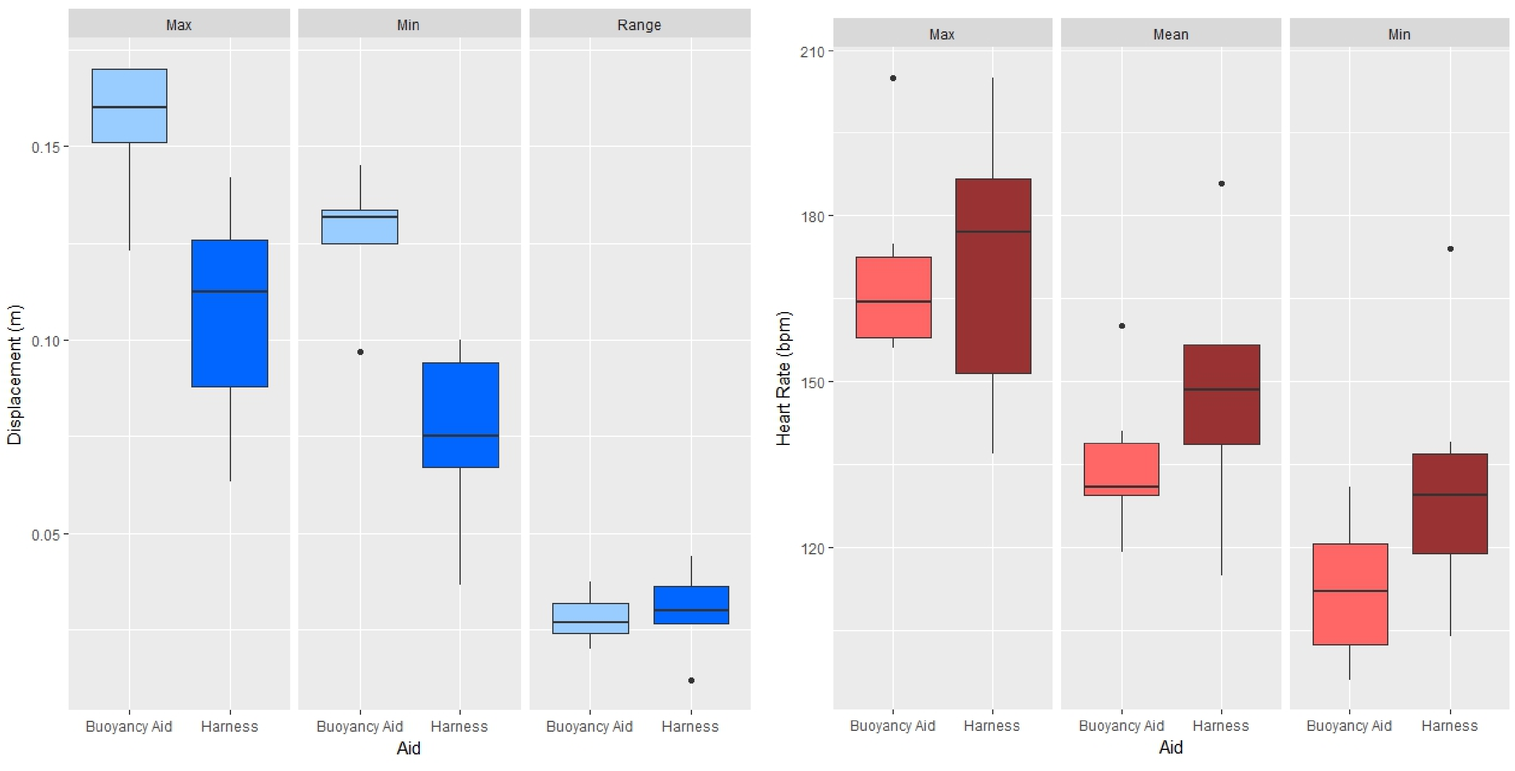
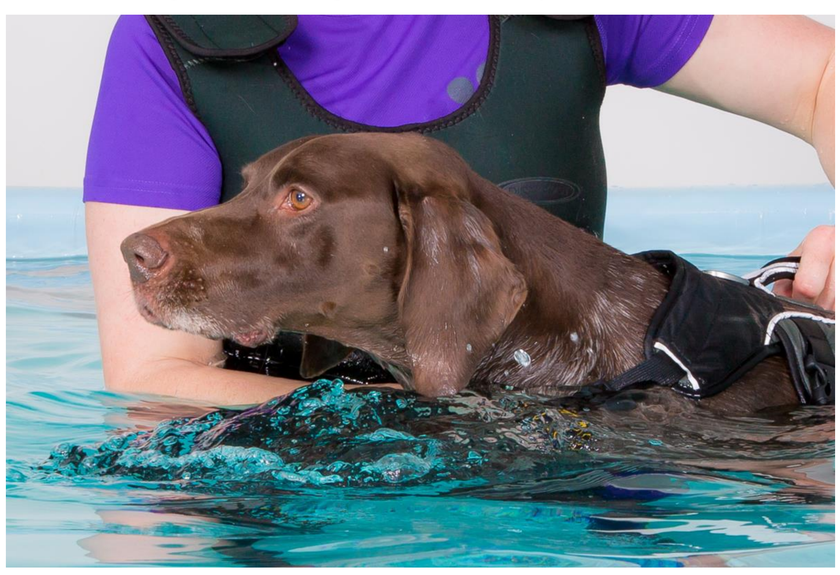
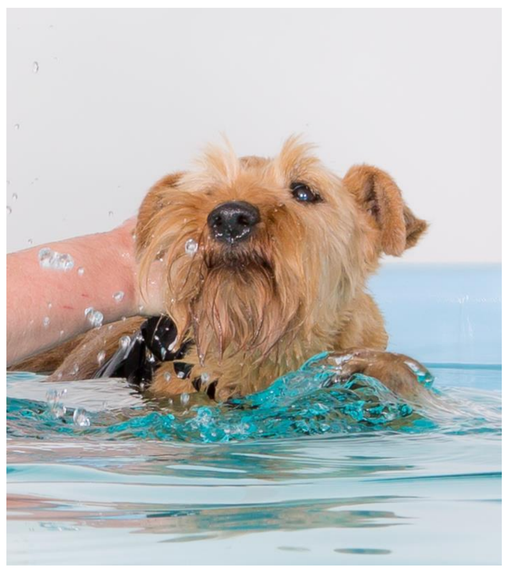


Figure 2. Displacement and Heart Rate of dogs wearing Buoyancy Aids and Harnesses
Maximum, minimum and the range of displacement for the buoyancy aid and harness is shown in blue on the left of the figure. Maximum, mean and minimum heart rate for the buoyancy aid and harness is shown in red on the right of the figure. Circles represent outliers.





Discussion

The data gained in this study indicated that using buoyancy aids may result in decreased heart rate compared to a standard safety harness. This may be of benefit for dogs with cardiovascular conditions or those lacking fitness. Dogs were displaced further out of the water when swimming wearing a buoyancy jacket which supports previous research that found altered positioning and limb movements in dogs swimming with a flotation device [3]. It could be suggested that whilst buoyancy jackets help to reduce the energetic demands of swimming for weak and vulnerable patients, safety harnesses may be better suited to encouraging biomechanically normal swimming in fit, healthy dogs. Further research is needed to examine the physiological and biomechanical parameters of healthy and pathological dogs during swimming.

References
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